

**Claims****1. Piston compressor comprising:**

a piston (12) which oscillates in a cylinder (14) and, in a filling position, compresses gas in a cylinder pressure space (20),

gas bearing nozzles (28) arranged in the piston area for gas-supporting the piston (12),

a compressed-gas accumulator (34) connected with the gas bearing nozzles (28),

a compressed-gas supply line (18) between the cylinder pressure space (20) and the compressed-gas accumulator (34), and

an inlet valve (42) in the compressed-gas supply line (18), the inlet valve being open in the filling position of the piston (12),

characterized in that

the inlet valve (42) is defined by a cylinder wall opening (22) and a piston wall opening (38) which, in the filling position of the piston (12), are located opposite each other and define an open valve, and, in a non-filling position, are closed by the piston wall (40) and the cylinder wall (24), respectively, and define a closed valve.

**2. Piston compressor according to claim 1, characterized in that the cylinder wall opening (22) and/or the piston wall opening (38) are configured as a circular groove (39).**

3. Piston compressor according to claim 1 or 2, characterized in that the compressed-gas supply line (18) is arranged in the cylinder housing (16) between the cylinder pressure space (20) and the inlet valve (42).
4. Piston compressor according to claim 1 or 2, characterized in that the compressed-gas supply line (164) is arranged in the piston (112) between the piston bottom (172) and the piston wall.
5. Piston compressor according to one of claims 1-4, characterized in that the compressed-gas accumulator (34) and the gas bearing nozzles (28) are arranged in the piston (12).
6. Piston compressor according to one of claims 1-5, characterized in that in the compressed-gas supply line (164) a second inlet valve (148) defined by a second cylinder wall opening (176) and a second piston wall opening (174) is arranged.
7. Piston compressor according to one of claims 1-6, characterized in that in the cylinder (114) an anti-twist device is provided which prevents the piston (112) from twisting in the cylinder (114).
8. Piston compressor according to one of claims 1-7, characterized in that each gas bearing nozzle (28) is formed by a wire inserted in a nozzle bore.
9. Piston compressor according to one of claims 1-7, characterized in that each gas bearing nozzle (28) is formed by a gas-permeable plug of sintered material.
10. Piston compressor according to one of claims 1-9, characterized in that the gas bearing nozzles (28) are arranged in a respective transversal plane at the level of the two piston end portions.

11. Piston compressor according to one of claims 1-10, characterized in that the gas bearing nozzles (28) are provided in the piston (12).
12. Piston compressor according to one of claims 1-11, characterized in that the gas bearing nozzles (229) are arranged in the cylinder housing (216).
13. Piston compressor according to one of claims 1-12, characterized in that a pneumatic piston end-position control device is provided which comprises:
  - a control pressure accumulator (360) in the piston (312), wherein the control pressure accumulator (360) is connected with a control pressure accumulator piston wall opening (356) in the piston wall,
  - a constant-pressure gas source (350) connected via a line (352) with a cylinder wall opening (354) which defines together with the control pressure accumulator piston wall opening (356) a control valve (358) and, in the end position of the piston (312), is located opposite the control pressure accumulator piston wall opening (356), and
  - a line (364) between the cylinder pressure space (366) and a cylinder wall opening (368) which together with the control pressure accumulator piston wall opening (356) defines a discharge valve (370) and, during a cycle in a non-end position of the piston (312), is located opposite the control pressure accumulator opening (356).
14. Stirling cooler comprising a cold finger (460) and a piston compressor (10) according to one of claims 1-13, wherein

the cold finger (460) comprises a displacer piston (462) in a cold finger cylinder housing (464),

the cold finger (460) comprises a compressed-gas accumulator (466) and gas bearing nozzles (468) connected therewith for supporting the displacer piston (462),

the cold finger compressed-gas accumulator (466) is connected via a cold finger gas supply line (470) with the piston compressor compressed-gas accumulator (34), and

in the cold finger gas supply line (470) a valve (480) is arranged which is defined by a piston wall opening (482) and a cylinder wall opening (484) of the piston compressor (10) and is opened when the piston compressor piston (12) is in a filling position.